



# UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE

United States Patent and Trademark Office

Address: COMMISSIONER FOR PATENTS

P.O. Box 1450

Alexandria, Virginia 22313-1450

www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/574,187	02/21/2007	Michael Joseph Cooke	GJE001-US	7470
24222	7590	03/09/2009	EXAMINER	
Vern Maine & Associates 100 MAIN STREET P O BOX 3445 NASHUA, NH 03061-3445			VINIL LAN	
			ART UNIT	PAPER NUMBER
			1792	
			MAIL DATE	DELIVERY MODE
			03/09/2009	PAPER

**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

### Office Action Summary

**Application No.**

10/574,187

**Applicant(s)**

COOKE ET AL.

**Examiner**

LAN VINH

**Art Unit**

1792

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 12/11/2008.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1-37 and 39 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-37 and 39 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some \* c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
  2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO/CDC)
- 4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date: \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application
- 6) ☐ Other: \_\_\_\_\_
- Paper No(s)/Mail Date: \_\_\_\_\_

## **DETAILED ACTION**

### ***Response to Arguments***

1. Applicant's arguments, pages 8-17 of the response filed on 12/11/2008, with respect to the rejection of claims 1-11, 13-19, 21-24, 25-28, 30, 33-38 under 35 U.S.C. 102(b) as being anticipated by Ni et al (US 6,257,168)/ claims 12, 20, 29,31-32 under 35 U.S.C 103(a) as set forth in the previous office action have been considered but are moot in view of the new ground(s) of rejection.

The new ground of rejection(s) follow

### ***Claim Objections***

2. Claim 14 is objected to because of the following informalities: the dependency of claim 14 is missing. Appropriate correction is required.

For the purpose of examination, claim 14 is best understood as depending on claim

1

### ***Claim Rejections - 35 USC § 102***

3. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States

only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

Claims 1-8, 13, 15-19, 23-24 are rejected under 35 U.S.C. 102(b) as being anticipated by Choquette et al (US 2002/0121501)

Choquette discloses a plasma etcher/apparatus for plasma treating a substrate comprising : a chamber 20 within which at least one gas are caused to flow ; flow system 25 configured to cause a flow of at least one gas within said chamber and to remove said gas from said chamber, RF power applied by coil 22/inductive plasma generator for causing the at least one gas within the chamber to form a plasma, thereby generating at least one species said plasma being generated in a plasma generation region 32 extending between a wall of said chamber and a first width; and a detachable guide 28 for directing the gas flow containing the species towards said substrate 24 to be treated, said guide defining a path through which said at least one gas and said at least one species flow from said plasma generating region to said substrate; said guide having an upper opening/an entrance and a lower opening/an exit, said entrance having a second width and being disposed proximal to said plasma generating region, said exit having a third width and being disposed proximal to said substrate to be treated; said second width being greater than said first width, and said third width is less than said first width, said guide being configured such that at least one gas is directed toward said substrate to be treated; wherein the apparatus is arranged such that the width of the plasma in use is greater than that of the substrate (page 2, paragraph 0017; fig. 3)

It is noted that claims 1, 2, 8, 13, 24, drawn to an apparatus and the recitations of " is adapted to direct towards the substrate at least the species generated substantially at or

adjacent the periphery of the plasma", " to prevent line of sight between said substrate to be treated and said plasma generating region so as to shield the substrate from electromagnetic radiation originating from the plasma" and " is configured to prevent the quenching of active species within the gas flow", "arranged to recompress the plasma as it flows substantially radially in a region adjacent the edge of the substrate" are considered as intended use/functional claim language. It has been held that claims directed to apparatus must be distinguished from the prior art in terms of structure rather than function. In re Danly, 263 F.2d 844, 847, 120 USPQ 528,531 (CCPA 1959). Also, a claim containing a "recitation with respect to the manner in which a claimed apparatus is intended to be employed does not differentiate the claimed apparatus from a prior art apparatus" if the prior art apparatus teaches all the structural limitations of the claim. Ex parte Masham, 2 USPQ2d 1647 (Bd. Pat. App. & Inter. 1987)

Regarding claim 3, Choquette discloses that the chamber comprises a gas-deliver component for supplying gas into the chamber/inlet and a deflector device 28 within the chamber for directing the introduced into the chamber towards most active region of the plasma ( fig. 3)

Regarding claims 4-6, Choquette discloses that the top opening of guide 28 is substantially curved in section/ the guide is substantially linear in section/ the guide is substantially a hollow conical frustum (fig. 3)

Regarding claims 7-8, 15-16, fig. 3 of Choquette shows that the guide 28 is provided with asymmetrical walls between said entrance and exit and wherein said center of said guide is disposed asymmetrically with respect to said substrate 24, resulting in a bulk

flow of said at least one species across the substrate, the substrate is shielded by the guide 28, the guide is detachable from the chamber wall

Regarding claims 18-19, Choquette discloses that the chamber comprises a support 26 for support the substrate (fig. 3)

Regarding claim 23, Choquette discloses that the guide is arranged to have an external dimension just less than that of the chamber such that, during use the guide undergoes thermal expansion and comes into thermal contact with the chamber (fig. 3)

Regarding claim 24, Choquette discloses that the guide 28 comprises an underside surface (fig. 3)

4. Claims 1-2, 18, 21-22 are rejected under 35 U.S.C. 102(e) as being anticipated by Johnson et al (US 2003/0201069)

Johnson discloses a plasma etcher/apparatus for plasma treating a substrate comprising : a chamber within which at least one gas are caused to flow ; flow system 290 configured to cause a flow of at least one gas within said chamber and to remove said gas from said chamber, RF power applied by coil 150/inductive plasma generator for causing the at least one gas within the chamber to form a plasma, thereby generating at least one species said plasma being generated in a plasma generation region 130 extending between a wall of said chamber and a first width; an electrical supply system 180 adapted to supply power to the substrate support and a focus ring/guide 200, mounted to a support for supporting substrate 176 , for directing the gas flow containing the species towards said substrate 176 to be treated, said guide defining

a path through which said at least one gas and said at least one species flow from said plasma generating region to said substrate; said guide having an upper opening/an entrance and a lower opening/an exit, said entrance having a second width and being disposed proximal to said plasma generating region, said exit having a third width and being disposed proximal to said substrate to be treated; said second width being greater than said first width, and said third width is less than said first width, said guide being configured such that at least one gas is directed toward said substrate to be treated; wherein the apparatus is arranged such that the width of the plasma in use is greater than that of the substrate ( page 2, paragraph 0025, page 3, paragraphs 0031-0032; fig. 1A )

5. Claims 25-28, 30-31, 33-37 are rejected under 35 U.S.C. 102(e) as being anticipated by Johnson et al (US 2003/0201069)

Johnson discloses a method for plasma processing comprises:

causing at least one gas (chlorine) to flow within a chamber; forming a plasma (inductive coupled) from the at least one gas within the chamber using a plasma generator having a power input of 5 kW, thereby generating at least one species ( page 3, paragraph 0029; page 4, paragraphs 0037, 0047), providing RF power 180/electrical power to the substrate ( page 4, paragraph 0039), and directing the gas flow containing the species towards the substrate 176 with a focus ring/guide 200 having an opening proximate to said plasma generating region 130 having a diameter greater than that of an opposing opening proximate to said substrate wherein the width of the plasma in use

is greater than that of the substrate, the difference between the widths defining an outer region of plasma, and wherein the species are directed from substantially all of the outer region, towards the substrate (page 5, paragraph 0047, fig. 1A)

The limitations of claims 26-28, 31 have been described above

Regarding claims 33-34, Johnson discloses performing etching and depositing processes (page 4, paragraph 0037)

Regarding claims 35-37, fig. 1A of Johnson shows that the plasma species generated substantially at or adjacent the periphery of the plasma are guided onto the substrate by the ring 200, the gas is directed into the chamber towards the most active region (s) of the plasma by inlet 290 causing a flow 130 of the plasma/species across the substrate.

### ***Claim Rejections - 35 USC § 103***

6. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 9-12, 39 are rejected under 35 U.S.C. 103(a) as being unpatentable over Choquette et al (US 2002/0121501) in view of Hatanaka et al( US 5962083)

Choquette has been described above. Unlike the instant claimed inventions as per claims 9-12, Choquette fails to disclose an electrically conducting mesh/a magnet/plasma termination device disposed between said plasma generating region



and said substrate so as to attenuate the supply of electrically charged species to the substrate, the grid mesh mounted to the guide and through which the gas flow passes when travelling between the entrance opening and exit opening of the guide.

Hatanaka discloses a plasma CVD apparatus comprises a electrically conducting mesh 14 disposed between a plasma generating region and a substrate 7 and a magnet 2 ( col 4, lines 1-20; fig. 1)

One skilled in the art at the time the invention was made would have found it obvious to modify Choquette plasma apparatus to include an electrically conducting mesh/plasma termination device mounted to the guide disposed between the plasma generating region and the substrate to control the electrons, negative and positive ions in the plasma as taught by Hatanaka (col 4, lines 30-35) thus achieving uniform etching/depositing processes

7. Claim 14 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choquette et al (US 2002/0121501) in view of Ni et al (US 6,257,168)

Choquette apparatus has been described above. Unlike the instant claimed invention as per claim 14, Choquette fails to disclose a guide heating system arranged to heat the guide to a predetermined temperature

Ni discloses a plasma apparatus comprises a heating system arranged to heat the guide 402 (col 10, lines 46-47)

One skilled in the art at the time the invention was made would have found it obvious to modify Choquette apparatus to include an heating system arranged to heat the guide

to reduce the amount of polymer build up on the surface of the ring as taught by Ni (col 10, lines 45-50)

8. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Choquette et al (US 2002/0121501) in view of Yoshimura et al (US 6,059,985)

Choquette apparatus has been described above. Unlike the instant claimed invention as per claim 20, Choquette fails to disclose using a movable support to provide a variable distance between the plasma and the substrate

Yoshimura discloses a plasma apparatus comprises a movable support 10 to support a substrate (col 7, lines 52-57)

One skilled in the art at the time the invention was made would have found it obvious to modify Choquette apparatus to include a movable substrate support to prevent another plasma from entering into the space between the substrate and the plasma thus improving plasma uniformity

9. Claims 29, 32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johnson et al (US 2003/0201069) in view of Demmin et al (US 6,635,185)

Johnson method has been described above. Unlike the instant claimed invention as per claims 29,32, Johnson fails to disclose the specific values of the chamber pressure, and gas flow rate

Demmin, in a method of etching, discloses that chamber pressure, power and etching composition flow rate are plasma etching operating conditions that can have an effect

on the results obtained (col 7, lines 15-20)

One skilled in the art at the time the invention was made would have found it obvious to vary the chamber pressure and gas flow rate in Johnson method by conducting routine experimentations in order to optimize these value in view of Demmin teaching since Demmin discloses that one skilled in the art can vary these parameters accordingly to etch a desired material satisfactorily (col 7, lines 20-25)

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the date of this final action.

***Conclusion***

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to LAN VINH whose telephone number is (571)272-1471. The examiner can normally be reached on M-F 8:30-5:30 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nadine Norton can be reached on 571 272 1465. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Lan Vinh/  
Primary Examiner, Art Unit 1792

Application/Control Number: 10/574,187  
Art Unit: 1792

Page 12